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# Editorial: Surgical interventions in gastric cancer

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## Editorial on the research topic Surgical interventions in gastric cancers

Gastric cancer (GC) is the leading cause of cancer deaths and is considered the fifth most common cancer worldwide, accounting for 7.7% of all cancer deaths. Surgical treatment for GC has considerably improved in recent decades (1). The late nineteenth century marked the beginning of the surgical treatment of GC (2), and it is considered the only curative modality for early and some advanced forms of GC. (3–5)

The aim of surgical treatment of GC is to completely resect cancer cells with adequate margins and dissection of lymph nodes, followed by gastrointestinal reconstruction (6). Total, subtotal, and distal gastrectomies are routinely performed surgical procedures, and subsequent appropriate lymph node dissection is mandatory. The level of dissection is affected by the type of gastrectomy and disease extent.

Gastrointestinal reconstruction after gastrectomy can be achieved through various surgical techniques with permissible clinical outcomes as their main objectives. However, the ideal type of gastrectomy, level of lymph node dissection, and modality of reconstruction that can be chosen are still debated (7). Each functional reconstruction method has its advantages and disadvantages. Lee et al. showed that antiperistaltic reconstruction is significantly associated with delayed gastric emptying and bile reflux reduction.

According to the Japanese Gastric Cancer Treatment Guidelines 2018 (5th edition), gastrectomy surgeries are subdivided into curative and non-curative surgeries. Non-curative surgeries are offered to patients who are considered incurable and are divided into palliative and reduction surgeries depending on the aim of surgery (8). Palliative gastrectomy has not been approved by any guidelines to enhance the life span of patients with advanced GC and distant metastasis, except for critical circumstances or relieving symptoms (9).

The evolution of minimally invasive surgery is an important milestone in the field of surgical oncology (10). In early GC, the laparoscopic approach is favored in terms of the recovery period, risk of complications, and survival rate (5). Since Kitano et al. reported the first successful laparoscopic gastrectomy (LG) in 1994 (11), LG has globally replaced open gastrectomy in treating GC (11).

Tian et al. compared the outcomes, including efficacy and safety, of laparoscopic proximal gastrectomy (LPG) and laparoscopic total gastrectomy (LTG) in patients with proximal GC. They found that LPG can be an alternative to LTG for proximal GC, especially LPG with double-tract reconstruction/double flap technique (DFT), fewer lymph nodes were harvested, and the rate of postoperative anastomotic stenosis was higher in LPG than in LTG. Compared with LTG, LPG with esophagogastrectomy is associated with shorter operative time, less intraoperative blood loss, and higher rates of reflux esophagitis. No difference was found between LPG with double tract anastomosis/DFT and LTG.

In 2003, Hashizume et al. performed the first robotic gastrectomy (RG), which led to an increase in the number of studies on RG. Moreover, accumulating experience and the development and modification of robotic equipment led to the widespread application of RG in GC (12).

Feng et al. compared the perioperative and oncological outcomes of robotic and laparoscopic gastrectomy in patients with GC. They found that RG was associated with a longer operative time, less blood loss, earlier time to oral intake, shorter length of hospital stay, fewer complications, more retrieved lymph nodes, and higher cost.

In the last two decades, neoadjuvant chemotherapy (NACT) has played an essential role in improving the overall survival rate of patients with locally advanced disease (13–15). The elimination of micrometastases, improvement of tumor-related symptoms, and increase in survival rate are all advantages of NACT (14, 16). However, NACT may contribute to an increase in surgical complications and postoperative morbidities.

Regarding the optimal timing of surgery after NACT for locally advanced GC, Wang et al. concluded that patients who underwent surgery within 3–5 weeks experienced the maximal survival benefit without an increase in postoperative complications or a lower rate of complications.

Globally, the 5-year survival rate of GC is about 20%. The higher survival rates in South Korea and Japan are attributed to efficient screening programs that detect GC at earlier stages (17–19).

The effect of postoperative complications on the prognosis of GC remains controversial. Song et al. reported that serious complications after gastrectomy negatively affect the prognosis of patients with stage II/III GC. Serious complications worsen survival and are associated with inadequate adjuvant chemotherapy.

## Author contributions

SP supervised the conduct of this article. All authors approved the final version of the manuscript to be published.

## Conflict of interest

The authors declare that the article was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

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## References

1. Suh YS, Lee J, Woo H, Shin D, Kong SH, Lee HJ, et al. National cancer screening program for gastric cancer in Korea: nationwide treatment benefit and cost. *Cancer* (2020) 126:1929–39. doi: 10.1002/cncr.32753
2. Topi S, Santacroce L, Bottalico L, Ballini A, Inchingolo AD, Dipalma G, et al. Gastric cancer in history: A perspective interdisciplinary study. *Cancers (Basel)* (2020) 12:264. doi: 10.3390/cancers12020264
3. Sasako M, Saka M, Fukagawa T, Katai H, Sano T. Surgical treatment of advanced gastric cancer: Japanese perspective. *Dig Surg* (2007) 24:101–7. doi: 10.1159/000101896
4. Van Cutsem E, Sagaert X, Topal B, Haustermans K, Prenen H. Gastric cancer. *Lancet* (2016) 388:2654–64. doi: 10.1016/S0140-6736(16)30354-3
5. National Health Commission of The People's Republic of China. Chinese guidelines for diagnosis and treatment of gastric cancer 2018. English version. *Chin J Cancer Res* 2019 31:707–37. doi: 10.21147/j.issn.1000-9604.2019.05.01
6. Guideline Committee of the Korean Gastric Cancer Association (KGCA), Development Working Group & Review Panel. Development Working Group & Review Panel. Korean practice guideline for gastric cancer 2018: An evidence-based, multi-disciplinary approach. *J Gastric Cancer* (2019) 19:1–48. doi: 10.5230/jgc.2019.19.e8
7. National Comprehensive Cancer Network. *NCCN guideline: gastric cancer (version 3.2021)* [Internet]. Plymouth Meeting, Pennsylvania, USA: Plymouth Meeting (PA): National Comprehensive Cancer Network (2021). Available at: <http://www.nccn.org>.
8. Japanese Gastric Cancer Association. Japanese Gastric cancer treatment guidelines 2018. *Gastric Cancer* (2021) 24:1–21. doi: 10.1007/s10120-020-01042-y
9. Eom SS, Choi W, Eom BW, Park SH, Kim SJ, Kim YII, et al. A Comprehensive and Comparative Review of Global Gastric Cancer Treatment Guidelines. *J Gastric Cancer* (2022) 22(1):3–23. doi: 10.5230/jgc.2022.22.e10
10. Guideline Committee of the Korean Gastric Cancer Association (KGCA), Development Working Group & Review Panel and Development Working Group

& Review Panel. Korean Practice guideline for gastric cancer 2018: an evidence-based, multi-disciplinary approach. *J Gastric Cancer* (2019) 19:1–48. doi: 10.5230/jgc.2019.19.e8

11. Kitano S, Iso Y, Moriyama M, Sugimachi K. Laparoscopy-assisted billroth I gastrectomy. *Surg Laparoscopy Endosc* (1994) 4(2):146–8.
12. Hashizume M, Shimada M, Tomikawa M, Ikeda Y, Takahashi I, Abe R, et al. Early experiences of endoscopic procedures in general surgery assisted by a computer-enhanced surgical system. *Surg Endosc Other Intervent Tech* (2002) 16(8):1187–91. doi: 10.1007/s004640080154
13. Schuhmacher C, Gretschel S, Lordick F, Reichardt P, Hohenberger W, Eisenberger CF, et al. Neoadjuvant chemotherapy compared with surgery alone for locally advanced cancer of the stomach and cardia: european organisation for research and treatment of cancer randomized trial 40954. *J Clin Oncol* (2010) 28(35):5210. doi: 10.1200/JCO.2009.26.6114
14. Cunningham D, Allum WH, Stenning SP, Thompson JN, Van de Velde CJ, Nicolson M, et al. Perioperative chemotherapy versus surgery alone for resectable gastroesophageal cancer. *New Engl J Med* (2006) 355(1):11–20. doi: 10.1056/NEJMoa055531
15. Oki E, Emi Y, Kusumoto T, Sakaguchi Y, Yamamoto M, Sadanaga N, et al. Phase II study of docetaxel and s-1 (DS) as neoadjuvant chemotherapy for clinical stage III resectable gastric cancer. *Ann Surg Oncol* (2014) 21(7):2340–6. doi: 10.1245/s10434-014-3594-9
16. Téoule P, Trojan J, Bechstein W, Woeste G. Impact of neoadjuvant chemotherapy on postoperative morbidity after gastrectomy for gastric cancer. *Digestive Surg* (2015) 32(4):229–37. doi: 10.1159/000381884
17. Jun JK, Choi KS, Lee HY, Suh M, Park B, Song SH, et al. Effectiveness of the Korean national cancer screening program in reducing gastric cancer mortality. *Gastroenterology* (2017) 152:1319–1328.e7. doi: 10.1053/j.gastro.2017.01.029
18. Hamashima C. Systematic review group and guideline development group for gastric cancer screening guidelines. update version of the japanese guidelines for gastric cancer screening. *Jpn J Clin Oncol* (2018) 48:673–83. doi: 10.1093/jjco/hyy077
19. GBD 2017 Stomach Cancer Collaborators. The global, regional, and national burden of stomach cancer in 195 countries, 1990–2017: a systematic analysis for the global burden of disease study 2017. *Lancet Gastroenterol Hepatol* (2020) 5:42–54. doi: 10.1016/S2468-1253(19)30328-0